P24057.A10

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : Jong Han PARK et al.

Appl. No. : 10/641,143

Filed : August 15, 2003

Group Art Unit : 3744

Examiner : Chen Wen JIANG

Confirmation No. : 8547

For : MULTI-AIR CONDITIONER AND OPERATION METHOD THEREOF

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
U.S. Patent and Trademark Office
Customer Service Window, Mail Stop ISSUE FEE
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir :

In accordance with the duty of disclosure under 37 C.F.R. §1.56 and §§1.97-1.98 and supplemental to the Information Disclosure Statement that was filed on November 17, 2003, Applicants hereby submit a copy of a Partial European Search Report that was mailed on April 6, 2005, with respect to patent family member European Patent Application No. EP 03 25 5182.2, in which the following documents were cited:

U.S. Patent No. 5,309,733, together with patent family members U.S. Patent No. 5,388,422 and U.S. Patent No. 5,237,833;

European Patent Application Publication No. EP 0 575 063, together with patent family member U.S. Patent No. 5,347,826;

European Patent Application Publication No. EP 0 509 619, together with patent family member U.S. Patent No. 5,142,879;

U.S. Patent No. 5,009,077;

U.S. Patent No. 4,562,700;

U.S. Patent No. 5,996,368; and

Japanese Laid-Open Patent Publication No. HEI 2-106667, together with an English language abstract of the same and patent family member U.S. Patent No. 4,987,747.

The category of relevance, pertinent portions, and claims to which each document is relevant, as ascertained by the European Examiner are set forth in the Partial European Search Report.

Applicants also submit herewith a copy of a Chinese Office Action that was mailed on May 26, 2005, with respect to patent family member Chinese Patent Application No. CN 03164941.6, in which the following documents were cited:

U.S. Patent No. 5,237,833 (mentioned above);

U.S. Patent No. 5,848,537; and

U.S. Patent No. 5,050,396.

The relevance, pertinent portions, and claims to which each document is relevant, as ascertained by the Chinese Examiner are set forth in the Chinese Office Action.

Further to 37 C.F.R. §1.98 (a)(2)(ii), copies of the U.S. patents are not enclosed herewith. However, if any copies are needed, the Examiner is respectfully requested to contact the undersigned.

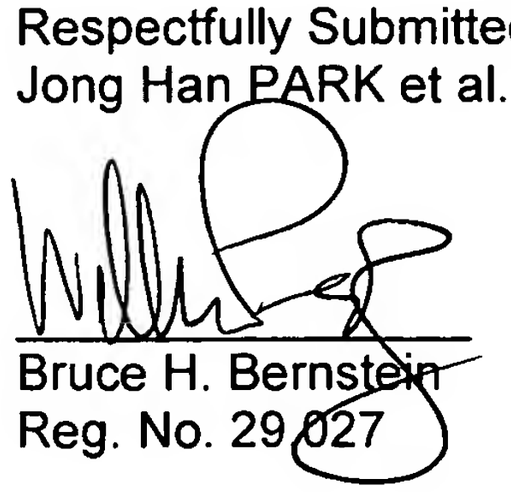
Applicants respectfully request that the Examiner consider the above material and cite the same. Copies of the above-noted foreign documents are attached hereto and all of the documents are listed on the attached PTO-1449 Form. Copies of the Partial European Search Report and the Chinese Office Action (and an English language translation) are also attached hereto. The Examiner is requested to initial the appropriate spaces on the attached Form and to return a copy of the completed Form to Applicants with the next official communication in the present application.

Applicants note that a Request for Continued Examination is being submitted herewith and thus no fee is required to ensure consideration of this Information Disclosure Statement.

Should the Examiner have any questions, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully Submitted,

Jong Han PARK et al.



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FORM PTO-1449 U.S. Department of Commerce Patent and Trademark Office	Atty. Docket No. P24057	Application No. 10/641,143
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)	Applicant Jong Han PARK et al.	
	Filing Date August 15, 2003	Group 3744

U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
		5 3 0 9 7 3 3	05/10/94	HAYASHIDA et al.			
		5 3 8 8 4 2 2	02/14/95	HAYASHIDA et al.			
		5 2 3 7 8 3 3	08/24/93	HAYASHIDA et al.			
		5 3 4 7 8 2 6	09/20/94	HAYASHIDA et al.			
		5 1 4 2 8 7 9	09/01/92	NAKAMURA et al.			
		5 0 0 9 0 7 7	04/23/91	OKOSHI et al.			
		4 5 6 2 7 0 0	01/07/86	ATSUMI et al.			
		5 9 9 6 3 6 8	12/07/99	KIM			
		4 9 8 7 7 4 7	01/29/91	NAKAMURA et al.			
		5 8 4 8 5 3 7	12/15/98	BIANCARDI et al.			
		5 0 5 0 3 9 6	09/24/91	OHKOSHI et al.			

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES	TRANSLATION NO
		0 5 7 5 0 6 3	12/22/93	E.P.O.				
		0 5 0 9 6 1 9	10/21/92	E.P.O.				
	2	- 1 0 6 6 6 7	04/18/90	JAPAN				

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

	1	English Language Abstract of JP 2-106667.

EXAMINER	DATE CONSIDERED

*EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

TEXT OF THE FIRST OFFICE ACTION

As stated in the description, the present application relates to a multi-air conditioner. After the examination, the opinions are provided as follows:

The Claim 1 does not possess inventiveness, and so does not comply with the provision of Article 22, paragraph 3 of the Patent Law of China. The reference 1 (US5237833A) discloses an air conditioning system, with the following technical features: "the system comprises a single heat source unit comprising a compressor, a four-way valve, a heat source unit side heat exchanger and an accumulator, it also comprises a plurality of indoor units, a vapor-liquid separator, an electrical expansion valve, a distributor and a connection pipe part, for example, the connection pipe for connecting the four-way valve with the distributor, the connection pipe for connecting the upper portion of the vapor-liquid separator with the distributor, and the connection pipe for connecting the lower portion of the vapor-liquid separator with the distributor" (see line 34 column 15 to line 29 column 48 of the description, and Figures 1-4 and 6 in the reference). Compared with the technical contents disclosed in the reference, the technical solution of the claim differs only in that "the gas-liquid separator of the Claim 1 is provided in the outdoor unit, while the vapor-liquid separator of the reference 1 is provided in the distributor". However, such difference is the common knowledge, just as shown in Figure 1 of US5848537A in which the gas-liquid separator is provided in the outdoor unit. It is obvious for those skilled in the art to obtain the technical solution of the claim on the basis of the reference combined with the above common knowledge. Therefore, the claim does not have prominent substantive features or represent notable progress, and thus does not possess inventiveness. In addition, the Claim 1 does not possess inventiveness with respect to the US5050396A.

The additional technical features further defined by the dependent Claims 2, 6-10 and 12-17 have also been disclosed in the reference 1. Therefore, the technical solutions of said claims do not possess inventiveness as prescribed in Article 22, paragraph 3 of the Patent Law of China either.

The additional technical features further defined by the dependent Claims 3-5 and 18 belong to the common knowledge. It is easy for those skilled in the art to obtain the technical solutions of the Claims 3-5 and 18 on the basis of the reference 1 combined with the common knowledge. Therefore, the technical solutions of the Claims 3-5 and 18 do not possess inventiveness.

It is known from the above comments that the technical solution of the independent Claim 19 and that of the Claim 1 do not belong to a single general inventive concept. They are not technically interrelated, do not contain the same or corresponding special technical features, and so do not possess unity of invention as prescribed in Article 31

of the Patent Law of China. The applicant should delete said independent claim. As for the invention beyond the scope of protection, the applicant may file a divisional application before the ending of the present case. Similarly, the independent Claim 20 and the Claim 1 do not comply with the provision of Article 31 of the Patent Law of China.

Based on the above reasons, the application can not be granted the right of patent under the present text. If the applicant fails to state sufficient reasons in the Observations for which the application possesses novelty and inventiveness with respect to the reference cited by the examiner, the present application shall be rejected.

Examiner: Yang Xiangjun

LYU

The proposed amendments to the claims

1. A multi-air conditioner comprising:

an outdoor unit installed at an outdoor location, and having therein a compressor, an outdoor heat exchanger, and an outdoor fan for ventilating the outdoor heat exchanger;

a plurality of indoor units installed at respective indoor rooms, each having therein an electronic expansion valve and an indoor heat exchanger;

a distributor provided between the outdoor unit and the plurality of indoor units, for selectively guiding a refrigerant introduced from the outdoor unit to the plurality of indoor units according to an operation condition;

a four-way valve provided on an outlet side of the compressor, for selectively switching a flow direction of the refrigerant flowing through the outdoor heat exchanger;

a selective expansion unit provided at a rear side of the outdoor heat exchanger, for selectively expanding the refrigerant according to the flow direction of the refrigerant;

a gas-liquid separator provided in the outdoor unit, for separating a vapor-phase refrigerant and a liquid-phase refrigerant from the refrigerant flowing out of the outdoor heat exchanger; and

a connection tube part having a first connection tube for connecting the four-way valve with a distributor, a second connection tube for connecting an upper portion of the gas-liquid separator with the distributor to guide the vapor-phase refrigerant, and a third connection tube for connecting a lower portion of the gas-liquid separator with the distributor to guide the liquid-phase refrigerant.

2. The multi-air conditioner of claim 1, wherein the four-way valve selectively switches between a first connection state in which the outlet side of the compressor is connected with the outdoor heat exchanger and an inlet side of the compressor is connected with the distributor~~separator~~, and a second connection state in which the outlet side of the compressor is connected with the distributor and the inlet side of the compressor is connected with the outdoor heat exchanger.

3. The multi-air conditioner of claim 1, wherein the selective expansion unit comprises:

a parallel tube connected between the outdoor heat exchanger and the gas-liquid separator;

a first check valve provided on one side of the parallel tube, for passing the refrigerant flowing from the outdoor heat exchanger toward the gas-liquid separator; and

a heating electronic expansion valve provided on the other side of the parallel tube, for expanding the refrigerant introduced into the outdoor heat exchanger.

4. The multi-air conditioner of claim 1, further comprising a bypass unit for guiding the refrigerant introduced through the second connection tube to the inlet of the

compressor, in case a majority of indoor units operate in the heating mode while the rest operates in the cooling mode.

5. The multi-air conditioner of claim 4, wherein the bypass unit comprises:

a bypass tube for connecting the vapor-phase tube with a tube connecting between the four-way valve~~tube~~ and the outdoor heat exchanger;

a first valve provided on the bypass tube, and opened only when the majority of indoor units operates in the cooling mode the rest operates in the heating mode; and

a second check valve provided on the second connection tube positioned between the gas-liquid separator and the bypass tube, for passing only the refrigerant flowing from the gas-liquid separator toward the distributor~~separator~~.

6. The multi-air conditioner of claim 5, wherein the distributor comprises:

a guide tube part for selectively guiding the refrigerant introduced from the outdoor unit to the respective indoor units, and guiding the refrigerant heat-exchanged in the respective indoor units to the outdoor unit; and

a valve part for controlling a flow of the refrigerant in the guide tube part such that the refrigerant is selectively introduced into the respective indoor unit according to the operation condition.

7. The multi-air conditioner of claim 6, wherein the guide tube part comprises:

vapor-phase branch tubes branched from the second connection tube and connected to the indoor units, respectively;

liquid-phase branch tube branched from the third connection tube and connected to the indoor units, respectively; and

connection branch tubes connecting the first connection tube and the indoor units, respectively.

8. The multi-air conditioner of claim 7, wherein the valve part comprises a two-way valve provided in each of the vapor-phase branch tubes, each of the liquid-phase branch tubes, and
each of the connection branch tubes, and turned on or off according to the operation condition.

9. The multi-air conditioner of claim 8, wherein each electronic expansion valve provided in each of the indoor units is provided in each of the liquid-phase branch tubes connecting the indoor heat exchangers and the distributor.

10. The multi-air conditioner of claim 1, further comprising control means for controlling revolution times of the outdoor fan such that a mixed ratio of a vapor-phase refrigerant and a liquid-phase refrigerant introduced to the gas-liquid separator via the outdoor heat exchanger is controlled according to the operation condition.

11. The multi-air conditioner of claim 10, wherein the control means comprises:

a temperature sensor provided between the outdoor heat exchanger and the gas-liquid separator, for sensing a temperature of the refrigerant; and

a microcomputer for comparing the sensed temperature of the refrigerant with a predetermined temperature to calculate the mixed ratio of the refrigerant, and for controlling the revolution times of the outdoor fan to equalize the calculated mixed ratio with the predetermined mixed ratio according to the operation condition, in case the indoor units all operate in the cooling mode, or in case a majority of indoor units operate in the cooling mode while the rest operates in the heating mode.

12. The multi-air conditioner of claim 9, wherein in case the indoor units all operate in the cooling mode or in case the majority of indoor units operate in the cooling mode while the rest operates in the heating mode, the four-way valve is switched to connect the outlet of the compressor with the outdoor heat exchanger and to connect the inlet of the compressor with the distributor.

13. The multi-air conditioner of claim 12, wherein in case the indoor units all operate in the cooling mode, the heating electronic expansion valve and the first valve are closed, the electronic expansion valves of the indoor units all operate, the two-way valves connected to the vapor-phase branch tubes are all closed, and the two-way valves connected to the connection branch tubes and the liquid-phase branch tubes are all opened.

14. The multi-air conditioner of claim 12, wherein in case the majority of indoor units operate in the cooling mode while the rest operates in the heating mode,

the heating electronic expansion valves and the first valve are closed,

in case of the indoor units operating in the cooling mode, the electronic expansion valves connected to the indoor heat exchangers operate, the two-way valves connected to the vapor-phase branch tubes are closed, and the two-way valves connected to the connection branch tubes and the liquid-phase branch tubes are opened, and

in case of the indoor units operating in the heating mode, the electronic expansion valves connected to the indoor heat exchangers are opened, and the two-way valves connected to the vapor-phase branch tubes, the liquid-phase branch tubes and the connection branch tubes are opened.

15. The multi-air conditioner of claim 9, wherein in case the indoor units all operate in the heating mode, or in case the majority of indoor units operate in the heating mode while the rest operates in the cooling mode,

the four-way valves are switched to connect the outlet of the compressor with the distributor and to connect the inlet of the compressor with the outdoor heat exchanger.

16. The multi-air conditioner of claim 15, wherein in case the indoor units all operate in the heating mode,

the heating electronic expansion valves operate, the first valve is closed, the electronic expansion valves of the indoor units are all opened, the two-way valves connected to the vapor-phase branch tubes are all closed, and the two-way valves

connected to the connection branch tubes and the liquid-phase branch tubes are all opened.

17. The multi-air conditioner of claim 15, wherein in case the majority of indoor units operate in the heating mode while the rest operates in the cooling mode,

the heating electronic expansion valve operates and the first valve is closed,

in case of the indoor units operating in the heating mode, the electronic expansion valves connected to the indoor heat exchangers are opened, the two-way valves connected to the vapor-phase branch tubes are closed, and the two-way valves connected to the connection branch tubes and the liquid-phase branch tubes are opened, and

in case of the indoor units operating in the cooling mode, the electronic expansion valves connected to the indoor heat exchangers operate, the two-way valves connected to the vapor phase branch tube and the liquid-phase branch tube are closed, and the two-way valves connected to the connection branch tube are opened.

18. The multi-air conditioner of claim 1, wherein the gas-liquid separator is provided between the selective expansion unit and the distributor.

19. An operation method of a multi-air conditioner as claim 1, the method comprises the steps of:

in case indoor units all operate in a cooling mode, or in case a majority of indoor units operate in the cooling mode while the rest operates in a heating mode, switching a four-way valve such that a refrigerant discharged from a compressor is introduced into an outdoor heat exchanger; and

closing a heating electronic expansion valve, and

in case the indoor units all operate in the heating mode, or in case the majority of indoor units operate in the heating mode while the rest operates in the cooling mode,

switching the four-way valve such that a vapor-phase refrigerant discharged from the compressor is introduced into a first connection tube; and

operating the heating electronic expansion valve.

20. An operation method of a multi-air conditioner as claim 1, the method comprises the steps of:

in case indoor units all operate in a cooling mode, or in case a majority of indoor units operate in the cooling mode while the rest operates in a heating mode,

sensing a temperature of a refrigerant using a temperature sensor; and

comparing the sensed temperature of the refrigerant with a predetermined temperature to detect a mixed ratio of the refrigerant in a tube; and

varying revolution times of an outdoor fan to equalize the detected mixed ratio with a predetermined mixed ratio.

PCT B0852

中华人民共和国国家知识产权局

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申请号：031649416	
申请人：LG 电子株式会社	
发明创造名称：多体空调器及其工作方法	

第一次审查意见通知书

1. ☑应申请人提出的实审请求，根据专利法第 35 条第 1 款的规定，国家知识产权局对上述发明专利申请进行实质审查。

   ☐根据专利法第 35 条第 2 款的规定，国家知识产权局决定自行对上述发明专利申请进行审查。

2. ☑申请人要求以其在：

   KR 专利局的申请日 2002 年 08 月 22 日为优先权日，
   专利局的申请日 年 月 日为优先权日，
   专利局的申请日 年 月 日为优先权日，
   专利局的申请日 年 月 日为优先权日，
   专利局的申请日 年 月 日为优先权日。

   ☑申请人已经提交了经原申请国受理机关证明的第一次提出的在先申请文件的副本。

   ☐申请人尚未提交经原申请国受理机关证明的第一次提出的在先申请文件的副本，根据专利法第 30 条的规定视为未提出优先权要求。

3. ☐经审查，申请人于：

   年 月 日提交的 不符合实施细则第 51 条的规定；
   年 月 日提交的 不符合专利法第 33 条的规定；
   年 月 日提交的

4. 审查针对的申请文件：

   ☑原始申请文件。 ☐审查是针对下述申请文件的

   申请日提交的原始申请文件的权利要求第 项、说明书第 页、附图第 页；

   年 月 日提交的权利要求第 项、说明书第 页、附图第 页；
   年 月 日提交的权利要求第 项、说明书第 页、附图第 页；
   年 月 日提交的权利要求第 项、说明书第 页、附图第 页；
   年 月 日提交的说明书摘要， 年 月 日提交的摘要附图。

5. ☐本通知书是在未进行检索的情况下作出的。

   ☑本通知书是在进行了检索的情况下作出的。

   ☑本通知书引用下述对比文献(其编号在今后的审查过程中继续沿用)：

编号	文件号或名称	公开日期（或抵触申请的申请日）
1.	US5237833A	1993.08.24

6. 审查的结论性意见：

   ☐关于说明书：

   ☐申请的内容属于专利法第 5 条规定的不授予专利权的范围。

   ☐说明书不符合专利法第 26 条第 3 款的规定。

第一次审查意见通知书正文

申请号：031649416

如说明书所述，本申请涉及一种多体空调器。经审查，现提出如下审查意见。

权利要求1不具备创造性，不符合专利法第22条第3款的规定。对比文件1（US5237833A）公开了一种空调系统，并具体公开了以下的技术特征"其包括一热源单元，该热源单元具有压缩机、四通阀、热源侧热交换器和储罐，还包括多个室内单元，气液分离器、电子膨胀阀、分配器以及连接管路部分，如连接四通阀雨分配器、连接气液分离器的上部与分配器和连接气液分离器的下部与分配器的管路部分"（参见该对比文件第15栏第34行-第48栏第29行及图1-4、6）。该权利要求所要求保护的技术方案与该对比文件所公开的技术内容相比，其区别仅在于"权利要求1中的气液分离器设置在室外单元内，而对比文件1中的气液分离器设置在分配器内"，然而这种区别是一种公知常识，如在US5848537A的附图1所示的一样，气液分离器设置在室外单元内。在该对比文件的基础上结合上述公知常识以获得该权利要求所要求保护的技术方案，对所属技术领域的技术人员来说是显而易见的，因此该权利要求不具备突出的实质性特点和显著的进步，因而不具备创造性。此外，权利要求1相对于US5050396A也不具备创造性。

从属权利要求2、6-10、12-17进一步限定的附加技术特征已在对比文件1中公开，因此权利要求2、6-10、12-17所要求保护的技术方案也不符合专利法第22条第3款有关创造性的规定。

权利要求3-5、18进一步限定的附加技术特征属于公知常识，本领域普通技术人员很容易以对比文件1为基础结合公知常识从而得到权利要求3-5、18请求保护的技术方案。因此，权利要求3-5、18请求保护的技术方案不具备创造性。

从上面的评述可知，独立权利要求19与权利要求1所要求保护的技术方案不属于一个总的发明构思，技术上无相互关联，没有相同或者相应的特定技术特征，不具备单一性，因此不符合专利法第31条的规定。申请人应当删除该独立权利要求。针对不再要求保护的发明，申请人可以在本申请结案之前另行提交分案申请。此外，独立权利要求20与权利要求1也不符合专利法第31条的规定。

基于上述理由，本申请按目前的文本是不能授权的，如果申请人不能在意见陈述书中提出相对于审查员引用的对比文件具有新颖性、创造性的充分理由，本申请将被驳回。

审查员：杨祥钧

代码：B310